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ABSTRACT

The most important issue of the 1990s is developing visionary leaders who can transform industrial era establishments into "learning communities of the future." Educational reform in the 1950s focused on mathematics and science, and the education reform movements of the early 1980s broadened the spectrum across the curriculum at all levels and for all areas of planning and policymaking. The education reform of the late 1980s differs from earlier efforts in that fundamental restructuring projects are in the early stages of evolution. Critical in future restructuring will be what happens in at least three areas: (1) linking academic and vocational tracks and university parallel and technical programs; (2) linking library and information services, which tend to be separate functions, and positioning them to enhance mission priorities and restructuring; and (3) linking vocational tracks in schools and technical programs in colleges and institutes with other establishments. Especially critical is the restructuring of vocational, technical, and occupational education, particularly for culturally diverse and special needs populations and in inner-city and rural areas. Access for all potential learners to academic and vocational-technical occupational programs of high quality is essential for improved quality of life and national competitiveness. During the 1990s, the United States must develop the infrastructure to invent human resource development systems that can evolve into learning communities of the future for all people. (Author/KC)

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High Tech - High Touch Collaboration

In Helping The United States To Develop

"Learning Communities of the Future"

by

Warren H. Groff

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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VISION

The very essence of leadership is you have to have a vision. It's got to be a vision you articulate clearly and forcefully on every occasion. You can't blow an uncertain trumpet.

Father Theodore Hesburgh

CREATING SOMETHING NEW AND FRESH

The major task for society and the economy is to create something new and fresh as opposed to just improving on the old.

Peter Drucker. Innovations and Entrepreneurship Principles and Practices. New York, NY: Harper and Row, Inc., 1985.

THINKING

Thinking with a fixed circle of ideas tends to restrict the questions to a limited field. And, if one's questions stay in a limited field, so also do the answers.

Lyall Watson. Lifestyle. New York, NY: Simon and Schuster, 1979.

CREATIVE ORGANIZATIONAL PROTOTYPES

I believe that there exists a possibility for a type of organization so fundamentally more creative than the traditional, authoritarian hierarchy that it is only dimly reflected, even in the most successful, current practitioners of new management principles.

Peter Senge. Sloan School of Management, Massachusetts Institute of Technology.

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* The Census Bureau uses the term "establishments" for firms that in "manufacturing" and institutions that provide "services." These terms are used in this document.

Abstract

Numerous issues will be important in the future. No issues, however, will be more important than developing the visionary leaders who can transform industrial era establishments into "Learning Communities of the Future." After the Sputniks were launched in 1957, education was criticized for failure to develop the critical mass of mathematicians and scientists to compete in the space race with U.S.S.R. The education reform movement that followed the Sputniks had a focus on discrete subjects such as math and the sciences. The education reform movement of the 1980s broadened the spectrum of projects (1) across the curriculum; (2) at all levels of the contemporary traditional education (CTE) pipeline; and (3) for all areas of planning, managing, and evaluating policy making and its implementation. The education reform of the late 1980s differs from earlier efforts in that fundamental restructuring projects are in the early stages of evolution. However, most projects deal primarily with the academic track and do not represent bold and creative paradigm shifts to partial or total technological deschooling, collaborative lifelong learning, problem based learning, etc.

Critical in future restructuring will be what happens in at least three areas: (1) linking academic and vocational tracks and university parallel and technical programs; (2) linking library and information services, which tend to be separate functions, and positioning them to enhance mission priorities and restructuring; and (3) linking vocational tracks in schools and technical programs in colleges and institutes with other establishments. Especially critical is the restructuring of vocational, technical, and occupational (VTO) education, particularly for culturally diverse and special needs populations and in inner city and rural areas. Access for all potential learners to academic and VTO programs of high quality is essential for improved quality of life and national competitiveness.

Bottom Line: The U.S. was preeminant in the world because it (1) created research universities as a part of an extensive private and public research and development infrastructure and (2) invented industrial era schools and colleges for mass public education to meet workforce needs. During the 1990s, the U.S. must develop the infrastructure to invent human resource development systems that can evolve into "Learning Communities of the Future" for all people.

High Tech - High Touch Collaboration

In Helping the United States To Develop

"Learning Communities of the Future"

Introduction

Numerous issues will be important in the future. No issues, however, will be more important than developing the critical mass of intellectual capital to tansform industrial era establishments into entirely new caring and learning environments. These new professionals must be bold, creative, proactive, visionary, transformational leaders. In the past, colleges and universities played a major role in shaping the future through instruction, research, and service -- usually in a reactive mode as opposed to a planned, proactive mode and often in a scholastic culture quite different and isolated from the real world. Colleges and universities prepared personnel to work in industrial era establishments, engaged in research about establishments which took on the characteristics of the industrial era factory, and provided some service to improve efficiency and enhance productivity within that model. This role is no longer sufficient. As the U.S. evolves from scholastic cultures of the Middle Ages to "Learning Communities of the Future," new expanded relationships are needed among levels of education and between establishments of the society of which they are a part.

Over the years several groups and persons have defined the purposes of education in our democratic society as the development of each person as (a) a worker, (b) a citizen, and (c) an individual. Since the beginning of the education reform movement, there has been little consensus about what constitutes the body of knowledge that is essential for each person to master in this democracy as it enters an advanced technical era (ATE), a necessary first step prior to considering to whom and how that knowledge will be disseminated, sometimes taught. Work in an ATE will focus on data and information processing. Workers will be expected to access data from a variety of different sources, interpret the data to creatively generate and package new knowledge, and distribute the new knowledge to consumers in a timely manner through communication and information technologies that transmit data, video and voice instantaneously and simultaneously.

Data and Information Processing

Access ⟶ Generate and Package New Knowledge ⟶ Distribute

The education reform after the Sputniks and the early 1980s can be labeled modernization. After the Sputniks were launched in 1957, education was critized for failure to develop the critical mass of mathematicians and scientists to compete in the space race with the USSR. The U.S. launched projects to redesign mathematics and science by calling upon the expertise of mathematicians, physicists, and other scientists. Education may have learned something about a new math and new sciences, but education did not learn how to teach math and sciences better to the full array of people who need this knowledge. The education reform movement of the early 1980s also was focused on modernization within bureaucratic, hierarchial, industrial era schools and colleges and was directed almost exclusively at the academic and university parallel tracks. Sometimes, technology was upgraded but rapidly became obsolete as more contemporary technology came from research and development laboratories. Rarely was human resources development of current educators given sufficient priority. Hence, reform efforts have yielded little return on investment.

Today educators are overwhelmed with students whose personal lives are made stressful through alcoholism, family dissolution, homelessness, child abuse, teenage pregnancy and parenting, AIDS, etc. As a result, educators must shift from Individual Education Plans to Individualized Family Service Plans for handicapped infants and toddlers to respond to the needs of the "whole" child. The shift is toward interestablishment collaboration. Although informal relationships develop between education and other establishments, most persons receive no formal preservice or inservice training in collaboration. Furthermore, too often policy and bureaucratic constraints impede restructuring to enhance any of the three purposes of education in our democratic society or to improve the quality of life.

The 1990s will focus on fundamental restructuring. Fundamental restructuring of society's basic institutions and systems is occurring now. Bold, creative, and visionary approaches must be taken to enhance the likelihood of increased access and improved quality. Critical in future restructuring will be what happens in at least three areas: (1) linking academic and vocational tracks and university parallel and technical programs, (2) linking library and information services which tend to be separate functions, and (3) linking schools and colleges with other establishments. Especially critical is the restructuring of vocational, technical, and occupational (VTO) education, particularly for culturally diverse and special needs populations and in inner city and rural areas. Access to academic and VTO programs of high quality is essential for national competitiveness and improved quality of life.

Linking Academic and Vocational and Technical Education

Although the distance is only a few feet when elementary-school children move their chairs to form reading groups, it is a move which often determines the direction for the rest of their lives. The advanced reading group often becomes the academic or high quality vocational track students of tomorrow and the low reading group often becomes the low quality vocational track or general track students or dropouts.(1)

Data collected in 1983 for the National Longitudinal Survey of Labor Market Experience provide insight about what happens to students as they move through their required years of public schooling and into the workforce or pursue additional education. Of 100 students entering high school, 76 graduate and 24 drop out. Of the same 100 students, including dropouts, 19 graduate from a four year college and 16 complete some other type of postsecondary education program or training; 38 go directly to work; and 27 either are unemployed, not in the labor force, or in training programs they will not complete. Of the 76 students who stay in school and graduate, 34 graduate from a vocational curriculum, 31 graduate from a general curriculum, and 11 graduate from an academic curriculum.(2) The 1989 National Assessment of Vocational Education indicates that academic track students on average take 3.17 credits in the vocational track.(3)

The figures for dropout rate and curriculum completion by gender and racial/ethnic background are quite different.

	Total	Blacks		Hispanics		Whites	
	%	Males	Females	Males	Females	Males	Females
Dropouts	24	48	45	42	30	21	19
Completion	76	52	55	58	70	79	81
Vocational	34	17	21	21	35	26	38
General	31	29	29	29	28	36	31
Academic	11	6	5	8	7	17	12

Of those students who have not dropped out, Sedlak estimates at least two-thirds of the students are cognitively and emotionally disengaged from their learning.(4)

Data about disabled, handicapped, at-risk, and illiteracy are important in this discussion. Approximately 15 % of individuals are disabled or handicapped. Analysis indicates that as high as 65 % of inner city school children may be at risk. While 13 % of white Americans 17+ years of age are functionally illiterate, 43% of black and 56% of Hispanic Americans 17+ years of age are functionally illiterate. A large percentage of special needs students of all ages are in vocational and general programs.

Other data are important to consider. The number of Hispanics in the USA is growing five times faster than the total population. U.S. Hispanics, now at 20 million, will grow to 29 million by 2000 - 10% of the population. By 2025 Hispanics will be the largest minority group in the U.S. While 1 in 4 white Americans is under 17, 1 in 3 black Americans and 1 in 2 Hispanic Americans is under 17. Nearly 90% of the USA's Hispanics live in nine states: California (6.6 million, 23% of the state's population), Texas (4.1 m, 24%), New York (2.1 m, 12%), Florida (1.5 m, 12%), Illinois (.8 m, 7%), Arizona (.6 m, 18%), New Jersey (.6 m, 8%), New Mexico (.5 m, 35%), and Colorado (.4 m, 11%).

The educator workforce does not match the student profile. Data for 1984-85 were as follows:

	Students	Teachers
White	71.0%	89.6%
African-American	16.2%	6.9%
Hispanic	9.1%	1.9%
Asian-American	2.5%	.9%
Native American	.9%	.6%

The mismatch will be greater in the future. Blacks and Hispanics preparing to teach have declined in recent years.

The U.S. soon faces a shortfall of hundreds of thousands of science workers. Science courses are often a student's primary exposure to technology. What happens to students in science is a national disgrace and embarassment. Science and technology should be an essential part of early learning experiences while the curiosity of young children is uninhibited and it is possible to shape a mindset about an intellectual voyage of exploration that should never end. Instead, most students receive little science instruction until middle school and then the focus is primarily a series of exercises in memorization. Four of every five students take biology in high school, but fewer that a third continue with chemistry and less than half continue on to physics. A presentation at a National Science Foundation conference in 1988 indicated that of approximately 24,000 high schools, about 7,000 didn't even offer physics, 4,000 didn't offer chemistry, and 3,000 didn't offer biology. Many of the courses that were offered were taught by persons for whom science was not their major and the courses were offered with inadequate equipment or without a laboratory experience. No wonder that U.S. high school graduates rank last or near last among developed nations in science skills.

Most shocking is what happens in postsecondary science. In <u>They're Not Dumb, They're Different: Stalking the Second Tier</u>, Sheila Tobias indicates:(5)

> ...that between 1966 and 1988 the proportion of college freshman planning to major in science and mathematics

> fell by half. Even after the introductory course, the flow out of science continues seemingly unchecked: a third to a half of those who initially indicate an interest in science leave science well into the major, some even after completing a science degree.

A National Science Foundation study found that less than one third of the freshman who switched out of science and engineering felt the course work too difficult. Research indicates that students have little training in working collectively to solve problems and their experience has taught them to fear cooperation. Tobias concludes:

> College retention strategies cannot be left to chance. Even if--especially if--the nation achieves the massive restructuring proposed, tomorrow's recruit to science will not be of like mind and motivation as yesterday's. Restructuring or no restructuring, we need new thinking about "who will do science" and "why," thinking that may challenge science teachers to grapple with issues they have have not focused on before. These are how to recruit, teach, reward, and cultivate different kinds of students to science, students who are not younger versions of themselves.

Statistics on progress made by persons from different backgrounds as they are processed through the contemporary traditional educational pipeline from high school to graduate school are as follows:(6)

	White	Black	Hispanic
Graduate from high school	83%	72%	55%
Enter college	38%	29%	22%
Complete college	23%	12%	6%
Enter graduate school	14%	8%	4%

Greater inquality exists for Native Americans. Two year colleges play a major role in the attempt to correct inequality of opportunity in that they enroll 43% of all blacks, 55% of Hispanics, and 57% of Native Americans.(7)

The contemporary traditional eductional model that has evolved over the years is a set of discrete institutions that are labeled primarily by the age range of their students: nursery schools, day care centers, kindergarten, elementary schools, junior high schools, senior high schools, two year colleges, four year undergraduate colleges, universities with graduate programs, and post graduate institutions. "People working in each of the above institutions have virtually no connection with all the others and little awareness of educational activity provided by the total."(8)

Vocational, technical, and occupational (VTO) education is at a crossroads. VTO education in the U.S. was conceived

and developed for an industrial society. For the past several decades, however, the U.S. and other industrialized nations have been making the transition into an early technical era. During the 1990s the U.S. and other nations will move into an ATE. VTO must be restructured to reflect the society of which it is a part. More importantly, however, VTO must be restructured to be reflective of the evolving ATE. Data clearly suggest the need for thinking strategically about education and training in an ATE with some bold and creative ways for achieving greater equality of opportunity for all people through restructured establishments and entirely new learning paradigms.

Restructuring VTO within CTE will not be easy. Several projects underway are significant. The Southern Regional Education Board published Goals for Education: Challenge 2000 and formed a consortium for Improving General And Vocational Education In The High School to focus on mathematics, science, and communications skills.(9) Curriculum has been strengthened for manufacturing trades, health and related fields, and a few other areas by upgrading subjects and adding a technology course. Grubb and others at the National Center for Research in Vocational Education (NCRVE) listed several patterns in "The Cunning Hand, The Cultured Mind": Models For Integrating Vocational And Academic Education:(10)

1. Incorporating academic competencies into vocational courses.
2. Combining academic and vocational teachers to incorporate academic competencies into vocational courses.
3. Making the academic curriculum more vocationally relevant.
4. Modifying both academic and vocational education through curricula "alignment."
5. The Academy model: schools within schools that focus on a field -- health, electronics, business.
6. Replacing conventional departments with occupational clusters.
7. Single occupational high schools - magnet optional schools.
8. Maintain conventional academic and vocational departments, but organize to have career paths or occupational majors.

NCRVE projects involve conducting detailed job analyses for five occupations in the medical imaging family, targeting some resources on electronic networks and delivery systems, and expanding its research and technical assistance for special populations -- disabled and handicapped, at-risk and disadvantaged, and culturally diverse subgroups.

Are there other options beyond CTE? Partial or total technological deschooling (PTD) is a possibility as more technology is introduced into CTE. It is possible that genuine partnerships between education, the private sector,

and government could develop a total technological delivery system such as The Education Utility.(11) A proposal was develop for such a system through a Research and Development Center and four demonstration projeccts in each of six regions of the U.S.(12) Cooperative lifelong learning (CLL), including academic credit for public service, will probably also be used more extensively in the 1990s. A study at the Massachusetts Institute of Technology suggested CLL.(12) Problem based learning (PBL), with apprenticeship roots, is being implemented by The John A. Burns School of Medicine at the University of Hawaii which overhauled its curriculum and abandoned the lecture hall format. An overwhelming amount of information that students memorize becomes obsolete by graduation. Students now work in small groups researching answers to real health problems. Students interact with patients earlier and research medical science subjects in order to solve specific clinical health problems rather than attending lectures that cover only one subject such as physiology or pathology. The shift is from accumulation of facts and passive learning to synthesis of information and active application of knowledge through problem solving. Other scenarios are possible.

Several documents and projects can contribute to the base of understanding of the problem. These include Literacy For A Technological World by Michael J. Dyrenfurth, Technological Literacy: Challenge for Teacher Education by Joost Yff and Michael J. Butler, work by The Center For Occupational Research and Development and CORD's Advanced Technology Centers, Science Education Programs That Work by the Office of Educational Research and Improvement of the U.S. Department of Education, Project 2061: Science For All Americans by the American Association for the Advancement of Science, work by the Technical Education Research Centers, Preparing For Employment in the 1990s in New York, Jobs for Colorado's Future Study and Employability Skills Study in Colorado, Workforce 2000 in Florida, research such as The Context and Characteristics of Postsecondary Vocational Education Curriculum in the Year 2000: Implications for Policy by the Minnesota Research and Devcelopment Center for Vocational Education, "Think Tank" - an educational consortium in Phoenix, New Pathways To A Degree: Using Technologies to Open the College by The Annenberg/CPB Project, Year 2000: A Curriculum and Assessment Framework for the Future by the Ministry of Education in British Columbia, Vision 2000: Quality and Opportunity report of Ontario's Colleges of Applied Arts and Technology, and numerous other projects. Georgia converted its area vocational schools to postsecondary technical institutions. Pennsylvania is converting its area joint vocational schools into postsecondary technical institutes and has a proposal to create a higher education without walls system. Tennessee has a plan to use secondary vocational schools as sites for two year college programs and services.

Linking Library and Information Services

An ATE based on data and information processing will require a critical analysis of functions that have tended to be discrete, often competing departments, in traditional industrial era schools and colleges -- library, administrative data processing, academic computing, media center, institutional research, technology transfer, and outreach functions. The core competencies will be data and information processing even though the emphasis and sources will vary based on physical and social infrastructure in a geographic region or service area. For example, in an area with a large concentration of tertiary health care facilities and a commitment to basic research and the preparation of health services providers, the focus will be on data bases related to health status of people and conditions of the health and human services establishments in the area. An area with a concentration of manufacturing establishments, possibly electronic and communications corporations committed to basic research and production, the focus will be on a different infrastructure.

During the agricultural era and the creation and spread of the "common school," the teacher was the focal point of data and information, hence new knowledge. During the industrial era, educators in schools and colleges remained key persons in accessing data and information from a variety of "libraries," public and private. The library was positioned near the center of learning activity in schools and colleges. Administrative data processing consisted of files of categories of data unique to a function or office -- curriculum and instruction or "academic" affairs, student services, personnel, space, financial, etc. -- which had to be manually combined to produce meaning.

Data and information are POWER. The person who has access to data and information often has enormous power of influence in shaping policy, making resource allocation decisions, or keeping other unit managers on the defensive. With the invention of the computer in the 1940s and its application, data and information acquired new POWER. Comparable data over equal increments of time which determine direction and trends are a major asset in influencing policy, setting priorities, and allocating resources. Positioning the mainframe computer in an organization for administrative purposes was a key decision, as were decisions for establishing data files, access and use of those files, and setting programming priorities to achieve greater efficiency and productivity in units within the institution. All too often, priorities were set to improve efficency and productivity in "means" functions to the exclusions of "ends" functions. The miniaturization of electronics and the scientific and technological breakthroughs that resulted in the development of the

microcomputer added complexity to the problem. The microcomputer made possible distributive data processing and online computing. More people had greater access to data and information than ever before. The collection, formating, distribution, and trivial use of data became an obsession with a consequence of losing sight of mission, vision, and strategic directions. New units of institutional research and instituitional advancement were created that employed large numbers of staff simply to sustain the "dataglut" throughout the system in fact books.

During the 1970s and 1980s, schools and colleges matured planning, managing, and evaluating technology from Management By Objectives (MBO) to Strategic Planning (SP). SP went beyond the internal environment to assess the external environment -- demographic, social, economic, technological, political, and values data and information. In concept, the internal audit and external assessment should be a prelude to developing visions of the future and a preferred scenario. Business and industry began to use SP in the 1950s and 1960s. Private higher education began to use SP in the 1970s. Two year colleges and public schools began to use SP in the 1980s. Many schools and colleges have improved the internal audit. A few have assessed a limited number of variables in the external environment. In some instances, the process has caused additional "dataglut" and even contributed to cultural strain and image problems because an "opportunity" was seized that was not central to the mission or for which the establishment was unable or unwilling to commit the necessary resources. In addition, resources were required to maintain the hard copy internal and external factbooks which sometimes went online. Schools and colleges have not matured strategic planning to thinking strategically about alternative education.

Selecting an establishment's planning, managing, and evaluating (PME) process and positioning library and informational services, including institutional research and institutional advancement, is extremely important. There is one primary strategic planner for each establishment -- the chief executive officer. However, several principles are important in selecting the PME process and positioning that function and its support. The primary business of education is learning -- demonstrating value added to each individual which is recognized in a variety of way including diplomas, certificates, degrees, licences, employment, etc. Beyond these "ends," everything else is "means" -- student services, financial services, and institutional advancement services. If education is to have a tighter relationship with the community or service area of which it is a part, then data and information services must be positioned in such a way so as to enhance the continued development of its primary product or service lines. The problem has become more complicated with the commitment to outreach which

suggests that education will lead change as opposed to only reacting to it-- community/economic development, technology transfer, customized training, upgrading the existing workforce, retaining the dislocated, adult literacy, entrepreneurial development.(13) Forging a tighter relationship between programs and services and the community is a function of an organizational development plan that is dependent upon properly positioned library and information services and a human resources development plan -- OD + HRD.

The education reform movement after the Sputniks led to the commitment to accelerate the development of new knowledge in selected areas and to disseminate it quickly to reduce the lag in adoption of new knowledge. The federal government supported Research and Development Centers, Regional Educational Laboratories, and Educational Resource Information Centers. Many of these resources are online and include networks such as ADVOCNET, a national electronic mail system linking adult, vocational, and technical educators and administrators; EIS by the National Clearinghouse for Bilingual Education; and SpecialNet.

The role of the library has changed dramatically in the last decade. The library and media center have been transformed into an information and technology hub that is already indispensable to students and staff.(14) In many establishments, library circulation is computer controlled and holdings and identification cards are barcoded to speed up checkout through scanning by optical readers which are linked to circulation and can be used in acquisitions for holdings with high volume use. Card catalog drawers have been replaced by computer terminal search stations that not only scan resources within a library, but can also tap data bases and expert systems throughout the world. An important issue relates to the increase in scientific journals. Before 1978 there were 8,062 scientific journals. During the next decade, 26,621 scientific journals were added for a total of 34,683.(15) Small libraries cannot afford to acquire and circulate such an increased number of journals.

There is evidence that library and computing services organizations have begun to converge as the technologies used to store and transmit information become similar.(16) Furthermore, there is evidence that the characteristics inherent in information combined with the technical capability provided by new information technology have created the prospect of a new range of possibilities.(17) Distance is irrelevant. The data bases and expert systems can be accessed in a variety of settings -- workplace, community, or home. Are homes becoming high tech centers? A survey in 1990 indicated that 57 % of American homes have cable TV, and there are approximately 9,000 cable services.(18) A survey of 91 million households indicated

that 71 % had VCRs, 31 % answering machines, 22 % PCs, and 19 % had CDs.(19)

Scientific and technological advances in transitors, semiconductors, lasers, compact discs, cable television, word processors, satellite communications, fiber optics, and other fields are changing the basic structure of work and the way in which people must and will function as workers, citizens, and individuals. For example, consider but a few such advances. In December 1988, Intel Corporation unveiled the 80486 chip that can scan the 29,000 pages of the 29 volumes in Encyclopedia Britannica in 2 seconds. In January 1989, a switch was thrown and a house in Perryopolis, PA, became the first house in the U.S. to receive its telephone call and cable TV over a single conduit, a strand of flexible glass, known as fiber optics, only 0.005 inches in diameter. In December 1989, Germantown, TN, became the first area of the nation to install digital switching equipment as part of a state-of-the-art telecommuncications network initiated two years earlier. These advances make it possible for youngsters in these two municipalities to collaborate with the knowledge of Encyclopedia Britannica available instaneously, and anything else that is on line.

Scientific and technological advances in barcoding, optics, sensor, smart card, and voice activated devices have tremendous implications for the way in which work will be restructured. By the mid 1980s, 125 vendors demonstrated vision technology devices on the market at a Detroit show. Currently, there are 25 venders of smart card technology with many applications to health care. The Hospital of the Future exhibit at INFOMART assembles the most recent contemporary technology for an acute care room in a tertiary hospital. The Futures Center at the Franklin Institute Science Museum contains eight exhibit areas: FutureVision, FutureComputers, FurtureSpace, FutureEarth, FutureEnergy, FutureMaterials, FutureHealth, and Future and You.

Numerous organizations are providing leadership for information networking. The Association of Research Libraries (ARL) joined CAUSE and EDUCOM to form the Coalition For Networked Information. The Library of Congress created the Federal Library and Information Center Committee (FLICC) in 1965 to achieve better utilization of federal library and information center rsources. FLICC established the Federal Library and Information Network (FEDLINK) in 1978 to allow federal libraries to participate in the Online Computer Library Center.(OCLC) The Library of Congress is pilot testing with three secondary schools the use of a protype package of computers and optical disks.

The centrality of data and information services is seen in numerous activities and projects. One example is the White House Conference on Library and Information Services

for Productivity, for Literacy, and for Democracy will be held in July 1991. The National Commission on Libraries and Information Science (NCLIS), with assistance from a 30 member Conference Advisory Committee, is planning the White House Conference authorized under Public Law 100-382. The 50 states, District of Columbia and U.S. territories, as well as American Indian Tribes and federal library community are conducting preconference activities to ensure widespread participantion among their constituents to develop priorities. For example, Florida conducted regional activities at five sites prior to the Governor's Conference in December 1990. Michigan conducted four regional meetings prior to a statewide conference in June 1990. Pennsylvania conducted fourteen Governor's Forums prior to a Governor's Conference in September 1990. Tennessee conducted half-day area meetings at 16 sites plus four regional meetings prior to the Governor's Conference in October 1990. Texas conducted ten regional meetings prior to a statewide conference in January 1991. Many states have already benefitted from this focus on library and information services. For example, the Florida Long Range Plan for Interlibrary Cooperation is a means to share various databases and establish linkages, particularly in the four regional multitype library consortia. A series of papers were written on the topics of resources, literacy, productivity, and citizenship in Pennsylvania. Texas developed fact sheets for each of the three topics -- productivity, literacy, and democracy -- to assist in "Building Community Partnerships." Tennessee Secretary of State Bryant Millsaps reviewed the "21st Century Challenge" for education before calling for a central information hub in a computerized electronic library that could be accessed from home, offices, and schools; such a hub is significant in that Shelby State Community College, Memphis State University, and the Memphis and Shelby County Public Library and Information Center are all designing new facilities.

Senator Albert Gore proposed a network of information superhighways in 1979. In 1987, a report of the White House Office of Science and Technology Policy called for a national computer network to link government, scientific research, and higher education.(20) It is only a matter of form and time before electronic highways become a dominant delivery strategy for learning and work. How should education plan for interconnectivity through communication technologies? What are the implications for positioning functions that are beginning to converge? How does education analyze advances in science and technology and transform curriculum within CTE? Are youngsters living in "have" households better off attending CTE, or accessing "smart systems" and "expert teachers" from throughout the world in their home, libraries, and other places? What are the implications for providing equal access and equality of opportunity to generations of "have not" technopeasants?

Linking Schools and Colleges With Other Establishments

During the industrial era, establishments adopted the underlying principles of the division of labor, hierarchial structure, and other characteristics of the era. Attitudes, competencies, skills, and values acquired in the early formative years in school and honed in college were expected to last a lifetime. Schools and colleges, as did other establishments, developed a culture that was distinct and unique. These distinctive cultures often discouraged collaboration and genuine partnerships through mindset, policy, protectionism of clientele and resources, and other factors. Elitism is often in conflict with egalitarism and causes problems in horizontal integration and vertical articulation within CTE. The clash of cultures between education and other establishments helped to create a "learning enterprise" totally outside CTE, and which duplicates and exceeds CTE resources.(21) Education and training within CTE -- schools, colleges, and universities -- is less than that which exists outside CTE -- formal apprenticeship programs, employer-based training and development, second chance training, the corporate college, etc.(22) The education-to-work connection is weak.(23) In addition, a recent report which analyzed training and work in seven industrial nations concluded that U.S. firms cling to outmoded production models where workers are training only for dead-end jobs and called on business, education, and government to overhaul the "haphazard, incoherent and bureaucratic" system of job training.(24) Education must implement restructuring strategies to bring about closer harmony and sychronization with research and development centers and workplace environments.

Unprecedented rate and scope of change in science and technology is not a sudden and isolated happening. Rather, this explosion is the cumulative effect of integrating complex technology from a variety of fields that have been evolving at an ever increasing rate for the past several decades. Research and development centers produce hard and soft technology which is adapted by establishments and impacts on workplaces and workforce, changes in structure, work, and jobs. The national government funds over 300 research and development centers, approximately 200 of which belong to the Federal Laboratory Consortium. NSF funds numerous research centers. Gale Research Company regularly publishes a directory of research centers and several states have inventories such centers.(25) The Office of Technology Assessment, established by the Congress of the U.S. in 1972, regularly conducts research on technology and its impact.

The Census Bureau regularly collects information about establishments using 10 categories. Each aggregate category is a cluster of specific establishments. Data are collected in years ending in a 2 and 7. The Department of Labor (DOL)

regularly collects information about jobs using the Standard Classification (SIC) categories. The SIC categories used by DOL parallel the establishments categories used by the Census Bureau. For the past several years there has been a decline in manufacturing, category 4, and an increase in service establishments, category 9. The U.S. lost 200,000 manufacturing jobs in November 1990 and 800,000 in the 1980s. The type of research can provide insights about the human resources development system of the future and form a conceptual framework for a curriculum: content format, delivery system format, evaluation format.

In the early industrial era, the curriculum for the "practical arts" tended to be outside education -- apprenticeship training, hospital-based programs, etc. During the advanced industrial era, most of the generic curriculum for entry into the world of work was campus based with some clinical and cooperative experiences in work settings. Customized HRD was industry based with many programs offered by organizations such as the Society of Manufacturing Engineers, numerous health associations, the American Society for Training and Development, etc. Most schools and colleges have attempted to modernize campus based programs, a few have actually formed limited partnerships with corporations. Examples include the automotive big three and two year colleges.

Kenneth Boulding's general systems theory suggests that establishments can be classified into levels of complexity from machine-like to adaptive to cultural.(26) Andrew Van de Ven and Davis Whetten have added research about interorganizational relations.(27) The cultural level requires a shared vision based on values and respect. If consensus can be achieved about a shared vision between and among several establishments, than a cluster of strategies and techniques can be implemented under the concept of Total Quality Management (TQM) to move toward the vision.(28)

If greater efficiency is to be achieved within CTE/VTO, in whatever form, education must develop environmental scanning techniques to reduce the gap between workplace skill needs and education output. In better competitiveness through increased productivity is to be achieved, new "full service" interorganizational relationships must be created that may be primarily high tech cultures or primarily high touch cultures. To achieve either scenario, educators must acquire new transformational leadership shills, particularly visioning, and skills in systems theory, interorganizational relations, and a group of PME strategies and techniques for culture development, possibly through TQM.

Conclusions

The industrial nations and new industrialized countries of the world are passing through the early technical era to an advanced technical era. In addition, many nations and countries are restructuring economies and political systems. The global, economic, political, and technological restructuring will impact each nation and all people. Several newly industrialized nations, mostly on the Pacific Rim, have a distinct advantage in that they are now entering the expansion of education stage that the U.S. experienced several decades ago. In preparation for such expansion, these countries are auditing their existing system and assessing HRD policy, philosophy, and systems in developed nations around the world to build on strengths.(30) These countries are designing human resource development systems based on the principles of an advanced technical era.

As this democrary evolved through the phases of the agricultural and industrial eras, it expanded education for the elite and apprenticeship training for the crafts and trades and then developed the contemporary traditional education consisting of various tracks through bureaucratic levels. The education reform movement at the close of the 1980s has recognized the need for fundamenatal restructuring of basic establishments of society. However, much of the attention has been given to the academic track within CTE, almost to the exclusions of other tracks or the possibility of developing entirely new learning paradigms.

Business and industry and health care have been restructuring for the past several years. Several major corporations have had to restructure because of a variety of forces. For example, General Motors began with a vision of a new car made with contemporary hard technology and produced through the soft technology of TQM. GM, and other industries, first rejected statistical process control and statistical quality control until these techniques were implemented offshore and loss of market share required restructuring to survive. Now many corporations are redesigning products as well as paying closer attention to corporate culture. Can education apply these hard and soft technologies to restructure and produce a better product?

Numerous issues will be important in the 1990s. No issue will be more important than the design of the human resources development system that will contribute to improved quality of life and global competitiveness in an advanced technical era. America's choices are high skills or low wages. The U.S. must develop the critical mass of intellectual capital to envision new caring and learning environments and develop leaders to transform industrial era establishments into "Learning Community of the Future."(31)

Footnotes

1. Jill Rachlin. "The Label That Sticks." U.S. News and World Report. Vol. 107, No. 1, July 3, 1989, pp. 51-2.

2. Paul B. Cambell and Nancy F. Puleo. "What Happens To High School Students?" Vocational Education Journal. Vol. 61, No. 7, October 1986, pp. 21-2.

3. John G. Wirt, Lana D. Muraskin, David A. Goodwin, and Robert H. Meyer. Summary of Findings and Recommendations. Washington, DC: U.S. Department of Education, 1989.

Other volumes are as follows:

II. Implementation of the Perkins Act
III. Secondary Vocational Education
IV. Postsecondary Vocational Education
V. Handicapped and Disadvantaged Students -- Access to Quality Vocational Education

4. Michael Sedlak. Selling Students Short: Classroom Bargains and Academic Reform in the American High School. NY, NY: Teachers College Press, Columbia Univesity, 1986.

5. Sheila Tobias. They're Not Dumb, They're Different: Stalking the Second Tier. Tuscon, AZ: Research Corp., 1990.

6. Jana Cardoza. "Colleges Alerted: Pay Attention to Minorities - or Risk Future Survival". ETS Developments. Autumn 1986. Vol. XXXII. NO. 2. Pp. 8-10.

7. National Center for Educational Statistics. Chronicle of Higher Education. Vol. XXXVI, No. 21, Feb. 7, 1990, p 1.

8. Harold L. Hodgkinson. All One System: Demographics of Education, Kindergarten through Graduate School. Washington, DC: Institute for Educational Leadership, 1985.

9. Gene Bottoms and Alice Presson. Improving General And Vocational Education in the High Schools. Atlanta, GA: Southern Education Board, 1989.

10. W. Norton Grubb, et.al. "The Cunning Hand, The Cultured Mind": Models For Integrating Vocational And Academic Education. Berkeley, CA: National Center for Research in Vocational Education, 1990.

11. Hugh F. Cline, Randy Elliot Bennett, Roger C. Kershaw, Martin B. Schnelderman, Brian Stecher, and Susan Wilson. The Electronic Schoolhouse: The IBM Secondary School Computer Education Program. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers, 1986.

25. America's Choice: High Skills Or Low Wages. Rochester, NY: National Center on Education and the Economy, 1990.

26. William Toombs and Robert Wilkinson. An Inventory of Research Units in Pennsylvania. University Park, PA: The Center for the Study of Higher Education, 1983.

27. Kenneth Boulding. "General Systems Theory: The Skeleton of Science." Management Science, 1956, 2, pp. 197-208.

28. Andrew H. Van de Ven. "On the Nature, Formation, and Maintenance of Relations Among Organizations." Academy of Management Review. Vol. 1, No. 4, 1976, pp. 24-6.

David A. Whetten. "Interoprganizational Relations: A Review of the Field." Journal of Higher Education, 1981, 52, pp. 1-28.

29. Ellen E. Chaffee. "Managing for the 1990s." In Tasks for the New Decade, New Directions in Higher Eduction. San Francisco: Jossey-Bass, 1990.

30. Yng-chien Sheu. The Development of Vocational Industrial Education in the Republic of China (Taiwan). Taiwan: Paper prepared for the Ministry of Education, 1985.

The Vocational Industrial Education Journal of Taiwan (Vol. 7, No.5) compares vocational education in Sweden, Ireland, France, United Kingdon, Japan, United States, and West Germany.

31. Warren H. Groff. Perspectives on the Education and Training System of the Future. Columbus, Ohio: ERIC Clearinghouse on Adult, Career, and Vocational Education, The Ohio State University, 1986. ED 272 772.

_____ "The Learning Community of the Future: Education and Training in the 21st Century." Paper presented to the Commission on the Future of Community Colleges of the Am. Assoc. of Community and Junior Colleges, April 24, 1987. ED 280 538.

_____ "Achieving Excellence Through Strategic Planning: Snowmass Institute Report, 1988." Report of the week long Snowmass Institute on Strategic Planning for education leaders. ED 298 977.

_____ "Toward the 21st Century: Preparing Strategic Thinkers in Graduate and Postgraduate Education." Work of doctoral programs and strategic planning workshops.

Dennis D. Gooler. The Education Utility: The Power To Revitalize Education and Society. Englewood Cliffs, N.J.: Educational Technology Publications, 1986.

12. Warren H. Groff. Toward the 21st Century: Preparing Strategic Thinkers in Vocational, Technical, and Occupational Education. Summative Evaluation of VTO, 1984-1989. Nova University Higher Education Programs, Fall 1989. Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocatinal Education, 1989. ED 319 882.

13. Robert M. Fano, et.al. Lifelong Cooperative Learning. Cambridge, MA: Massachusetts Institute of Technology, 1982.

14. Mary Ann Roe. Education and U.S. Competitiveness: The Community College Role. Austin, TX: IC2 Instiutute, 1989.

15. Robert McCarthy. "The New Library/Media Center." Electronic Learning. Vol. 9, No. 8, May 1990, pp. 25-8.

16. The Chronicle of Higher Education. Vol. XXXVI, No. 24, February 28, 1990, pp. 1 and 13.

17. Elaine Didier. "Changing Pattrerns of Information Storage and Retrieval in American Libraries and Educational Resource Centers." Paper presented at EDUTEC '86, the all Japan Annual Education Technology Congress. ED 279 324.

18. Louis Vaglanos. "The Jewel in the Temple: University Library Networks as Paradigms for Universities." In Libraries and the Search for Academic Excellence, Proceedings of the Arden House Symposium, New York, March 15-17, 1987. ED 284 592.

19. The Commercial Appeal, September 16, 1990, p. B-9.

20. The Commercial Appeal, March 11, 1990, p. E-1
USA Today, March 20, 1990, p. A-10.

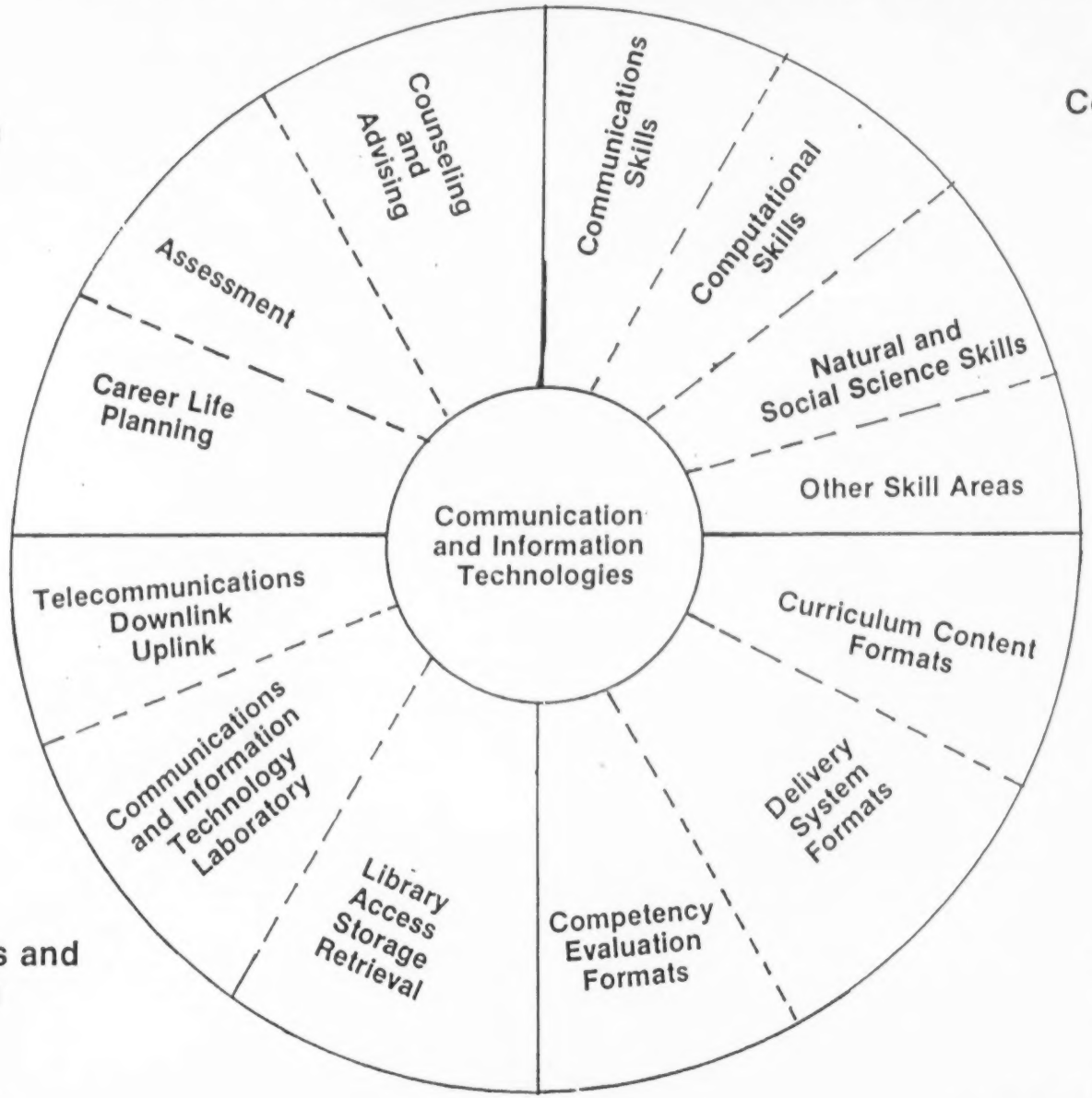
21. Albert Gore, Jr. "Information Superhighways: The Newxt Inforation Revolution." The Futurist. Vol. XXV, No. 1, January-February 1991, p. 21-3.

22. Anthony P. Carnevale and Leila J. Gainer. The Learning Enterprise. Washington, DC: The American Society for Training and Development, 1989.

23. Nell P. Eurich. Corporate Classrooms. Princeton, NJ: The Carnegie Foundation ForThe Advancement of Teaching, 1985.

24. The School-To-Work Connection. Washington, DC: U.S. Department of Labor, 1990.

COMPONENTS OF A HUMAN RESOURCES DEVELOPMENT SYSTEM



ALTERNATIVE EDUCATION

1. Contemporary Traditional Education (CTE) Models

   a. Within a CTE Classroom
   b. Within a CTE School
   c. Within a Single Subject - Math, Science, Humanities
   d. Between Subjects - Math and Science, English, and Social Sciences
   e. Between Tracks - Academic and Vocational
   f. Between Schools Within a District - Level, Magnet Schools
   g. Between Districts - "Choice"
   h. Within a State - No. Carolina School of Arts
   i. Special Focus - "At-Risk", Drop Out Prevention, Disciplines, Articulated, Differentiated/Developmental Curriculum, Learning Styles Pregnant Females, Substance Abusers, Cultural Diversity, Substance Abuse, Personal Abuse
   j. Between Layers - Middle College High School

2. Partial Technological Deschooling (PTD) Models

   a. Distant Learning Systems
   b. Apple Classrooms of Tomorrow - Elementary Level
   c. IBM's School of the Future - Secondary Level
   d. The Education Utility

3. Collaborative Lifelong Learning (CLL) Models

   a. Cooperative Education
   b. Clinical Affiliations
   c. Compacts - Academic Credit for Public Service
   d. Partnerships

4. Problem Based Learning (PBL) Models

5. Other Education and Training Provider (ETP) Models

   a. Nontraditional Private Providers
   b. Corporate Sponsored Providers
   c. Home Based Instruction, Correspondence

6. Role of Support Units

   a. Library and Instructional Materials
   b. Instructional Development and Media
   c. Student Assessment, Counseling, Diagnostic Services
   d. Administration
   e. Boards-Advisory, Committees, Directors, Foundations,Trustees

STRATEGIC THINKING

INTERNAL

AUDIT

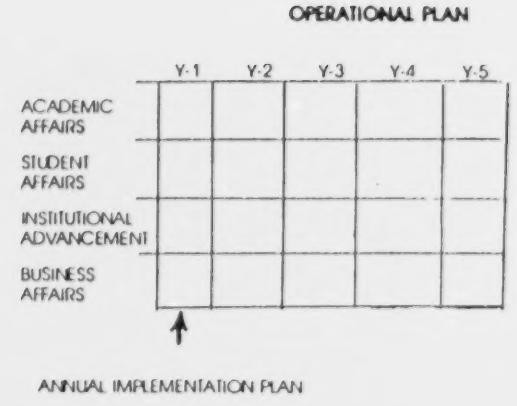
VISIONS:
ALTERNATIVE
SCENARIOS

1. 21st CENTURY
2. 1990s - 2nd HALF

PREFERRED
SCENARIO

EXTERNAL

ASSESSMENT



OPERATIONAL PLANNING

VISIONS OF THE FUTURE

	1955	1985	2000	2020
	Postindustrial Society	Early Technical Society	Advanced Technical Society	
HEALTH AND HUMAN SERVICES				
BUSINESS AND INDUSTRY				
GOVERNMENT AND MILITARY				
EDUCATION AND				

FEDERAL LABORATORY CONSORTIUM

CENSUS BUREAU CATEGORIES OF ESTABLISHMENTS

CATEGORIES OF ESTABLISHMENTS

1. Agricultural services, forestry, fisheries
2. Mining
3. Contract construction
4. Manufacturing
5. Transportation and public utilities
6. Wholesale trade
7. Retail trade
8. Finance, insurance, real estate
9. Services
10. Nonclassified

MANUFACTURING (#4)

1. Food and kindred products
2. Tobacco
3. Textile mill products
4. Apparel and other textile products
5. Lumber and wood products
6. Furniture and fixtures
7. Paper and allied products
8. Printing and publishing
9. Chemicals and allied products
10. Petroleum and coal products
11. Rubber and miscellaneous plastics products
12. Leather and leather products
13. Stone, clay and glass products
14. Primary metal industries
15. Fabricated metal products
16. Machinery, except electrical
17. Electric and electronic equipment
18. Transportation equipment
19. Instruments and related products
20. Miscellaneous manufacturing industries
21. Administrative and auxiliary

SERVICES (#9)

1. Hotels and lodging place
2. Personnel services
3. Business services
4. Auto repair services
5. Miscellaneous repair services
6. Amusement and recreational services
7. Health services
8. Legal services
9. Educational services
10. Social services
11. Museums, botanical zoological
12. Membership organizations
13. Miscellaneous services
14. Administrative and auxiliary

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FACTS & FINDINGS

INTERAGENCY LINKAGES: A FIELD STUDY

INTRODUCTION

Overlapping interests, activities, and functions are the reasons many agencies choose to work together. This need becomes even more urgent in times of resource scarcity. However, interagency relationships are not always successful. Many, in fact, fail because of unsuccessful intervention strategies or techniques.

How do relationships between organizations develop? What are the conditions that promote or hinder these relationships? Vocational education staff realize that working with other service deliverers is both necessary and desirable. But the conditions that foster or hinder such relations are not always well known.

This issue of *Facts & Findings* summarizes a field study of the relationships between a postsecondary vocational-technical institution and a secondary vocational school, a regional medical facility, and an economic development consortium with emphasis on training.

The purpose of this field study was to test the usability and practicality of a framework drawn from the field of interorganizational theory. The intent is to better predict and explain conditions leading to effective interagency linkages. Therefore, this study is for state-level planners, policymakers with responsibilities for vocational education and human resource development, and institutional administrators who wish to establish linkages with other organizations.

This study was supported by the Office of Vocational and Adult Education, U.S. Department of Education.

THE INTERORGANIZATIONAL FRAMEWORK

For this study, researchers developed a framework based on work by Andrew Van de Ven (1976). His model explained voluntary emerging of relationships between human service organizations and their functioning. The Van de Ven model was modified to illustrate conflict (both structural and procedural) and mutual benefit. The resulting framework has four dimensions (see figure 1):

- Situational dimensions
- Structural dimensions
- Process dimensions
- Outcome dimensions

These dimensions and their components are described in the field study summary.

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SITUATIONAL DIMENSIONS	STRUCTURAL DIMENSIONS
• Resource Interdependence/Mutual Benefit • Commitment • Awareness/Mutuality • Consensus	• Formalization • Centralization • Complexity • Conflict
PROCESS DIMENSIONS	**OUTCOME DIMENSIONS**
• Resource Flows • Information Flows • Conflict	• Effectiveness • Impact

Figure 1. Conditions for successful interorganizational relationships

DESCRIPTION OF ORGANIZATIONS

This study involved North Central Technical College in Mansfield, Ohio, and its collaborative relationships with Mansfield General Hospital, Pioneer Joint Vocational School, and the Mid-Ohio Consortium for Industrial Training.

North Central was selected as the focal organization because of its reputation in community outreach and its success with institutional strategic planning. It serves the community by offering associate degree and certificate programs and is a resource for training technicians for business and industry.

Mansfield General is the major medical facility in north central Ohio. In addition to health care services, it is a clinical setting for North Central students in four program areas: associate degree in nursing, licensed practical nursing, respiratory therapy, and radiological technology. By providing clinical experience, the hospital is able to select the best graduates as employees.

Pioneer Joint Vocational School provides 11th and 12th graders from five counties with vocational skills training. An articulation agreement between North Central and Pioneer enables these students to receive college credit for their work either by demonstrating their competency and achieving the required grade at the vocational school or passing a proficiency examination administered by the college. This reduces the possibility of high school graduates duplicating course content while at college. Both institutions are actively involved in setting up these arrangements and making them work.

The Mid-Ohio Consortium for Industrial Training facilitates and encourages economic development through training and retraining workers. Programs for business and industry emphasize customized job training, human resource development, increased productivity, and improved management efficiency. North Central occasionally engages in training efforts identified by and funded by the consortium. Also, the college provides the consortium's executive director with an office and a secretary and is, in return, represented on the consortium's executive, advisory, and training committees.

A SUMMARY OF THE FIELD STUDY

North Central's relationships with Mansfield General, Pioneer, and Mid-Ohio Consortium are described according to the dimensions found in the interorganizational framework. Vocational educators can see how the presence of these conditions and factors foster linkages and can apply them to their working relationships with others.

Situational Dimensions

Certain situational conditions are necessary for interagency linkages to develop. These are resource interdependence, commitment, awareness, and consensus.

Resource Interdependence, or the need to share resources, is one of the basic reasons interagency linkages occur. Among the linkages involved in this field study, the dependence of North Central on Mansfield General was the most apparent. The hospital—

- provides clinical experience for North Central's health technology students,
- advises North Central in developing and updating technical programs,
- sets standards of performance,
- funds a full-time radiological instructor, and
- furnishes clinical equipment and teaching tools.

In return, Mansfield General depends on North Central for a continuing supply of well-qualified personnel.

The relationship between North Central and Pioneer reveals an agreement that enables students from Pioneer to receive college credit from North Central for skills they develop at Pioneer. This translates the philosophical commitment of North Central into an operational goal and provides an incentive for Pioneer students. Also, both institutions have faculty members who serve on each other's advisory committees.

North Central and Mid-Ohio Consortium both felt that working together helps them reach their common goal of training and retraining workers for industry in north central Ohio. North Central receives some funds for industry training through the consortium and experiences good public relations through communication links with industry. The consortium receives an office, support services, and technical training and retraining referrals from North Central. Generally, the amount of resource interdependence correlates strongly with the degree of **commitment**, or dedication, to making the relationship work. As was expressed by the administrators at Mansfield General, commitment and cooperation must be fostered from the top. Visible elements of such dedication include written agreements between North Central and Mansfield General, the document describing credit arrangements between North Central and Pioneer, Mansfield General's funding of a radiological instructor, the office and support services provided to the consortium by North Central, and funds provided by the consortium to North Central for training industry workers.

Awareness involves (1) knowledge of environmental needs, problems, and opportunities; (2) knowledge of another agency's goals and services; and (3) a mutual respect and trust between agency representatives. Key persons in all the organizations involved in this field study possessed knowledge of the other organizations' needs for collaboration, opportunities for joint endeavors, and capabilities, services, and goals. In addition, linking agents in the organizations were well acquainted. Evidence exists of an administrative emphasis on acquainting faculty and staff members with their counterparts in other organizations. For example, the admissions people at North Central and the counselors of Pioneer knew each other well. Also, confidence and trust between student personnel counterparts and between the faculties of the two data processing programs were particularly strong. Likewise, the consortium executive director had the full confidence of the consortium board, which included the North Central president.

Consensus, in this context, means the agreement between agencies regarding the tasks they confront, approaches to those tasks, and agreement concerning role and scope, or domain. In applying the consensus factor to the field site, North Central and Mansfield General stated that although their goals are different—the college provides educational services and the hospital provides patient care—they are compatible. Both are interested in developing high-quality health care personnel and continuing health education, and both feel a strong commitment to the community, as their client groups come from a broad spectrum of local persons. Similarity in competencies and skills required of both staffs enhances the good working relationship between North Central and Mansfield General.

North Central and Pioneer agreed that commonalities in their goals and domain foster agreement between their organizations. Both are educational institutions; however, their clients are considerably different. Pioneer students are usually high school age but without a high school diploma, whereas the average student at North Central is 28. Joint agreements are put in place at the department or vocational-technical program level. The data processing program area has received the most attention, although other program areas are implementing the same kind of credit arrangement.

North Central and the Mid-Ohio Consortium believed that their organizational services are different, yet complementary. The consortium provides a consulting service and funds for training, while North Central offers continuing education. The clients of the two agencies are different in that North Central's clients are primarily students and the consortium's clients are primarily companies. Since the college also serves companies, this is a potential source of conflict. To handle this, the consortium training committee and executive committee discuss the company's training specifications to determine which consortium members can provide the service. The company then selects the institution it believes can best meet its training needs.

Structural Dimensions

Whereas the situational factors explain how interagency linkages emerge, the structural and process dimensions describe the relationship's essential and distinguishing aspects.

Formalization refers to the degree to which rules, policies, and procedures govern interorganizational agreements. Two common aspects of formalization are written agreements and advisory and policy-making structures. North Central and Mansfield General have the most detailed and extensive written agreements. The draft agreements for each program that uses the hospital as a clinical training site were written by North Central and finalized in discussions with Mansfield General. The agreements are reviewed and updated each year.

Though not quite as formal a document, the written agreement between North Central and Pioneer outlines how Pioneer students can receive college credit from North Central for skills gained in high school courses.

The Mid-Ohio Consortium has a revised constitution that indicates guidelines for operation and cooperation. This constitution serves as the agreement between the consortium and its members.

Representatives of all organizations found that although they have written agreements, they still work primarily through informal meeting and phone conversations. Usually, appropriate operations personnel in each organization handles the situation, although policy questions are handled at the administrative levels.

Centralization is concerned with the locus of power, influence, and decision making. All three dyads said most decisions are reached mutually. However, regarding the aspect of influence, the organization with more at stake in the relationship usually has the greatest influence in the decision. In the relationship between North Central and Mansfield General, for example, influence varies from program to program. In the hospital environment, North Central lacks power or status. On the other hand, the good reputation of North Central graduates enables the college to exert more influence in the educational environment.

Although decisions between North Central and Pioneer are reached mutually, both believed the college has more influence. This is because North Central receives both the requests for advanced status and the students matriculating from Pioneer.

In the relationship between North Central and the Mid-Ohio Consortium, the consortium executive director felt she had strong influence with the college president and less influence with faculty members. North Central's president believed that decisions were reached through a participatory management approach.

Complexity here means the number of linkages between two organizations and the number of functions involved. North Central and Mansfield General have the greatest number of linkages. These were through the four technical programs conducted by the college using the hospital as the clinical site: (1) associate degree in nursing, (2) licensed practical nursing, (3) radiological technology, and (4) respiratory therapy. Other linkages are through—

- joint continuing education programs,
- college staff on hospital committees,
- hospital staff on college program advisory committees,
- hospital serving as a site for field trips of other college programs,
- hospital professionals speaking in some college classes, and
- joint involvement in the Richland County Health Planning Development Council.

North Central and Pioneer also have a variety of linkages, the most important of which are developing and maintaining articulation agreements. These agreements require linkage at the administrative level, between student services units, and between program departments. Other

cooperative efforts between these two institutions involve developmental courses in chemistry and algebra, financial aid workshops, advisory committees, Career Day, College Night, special presentations in classes, and the Mid-Ohio Consortium for Industrial Training.

Structural conflict occurs over the basic identities and responsibilities that define a relationship. Such conflicts reflect an inability to establish or maintain the basic rules governing the relationship. The greatest potential for conflict appears to be in the relationship between North Central and Mansfield General, as both institutions operate a nursing program to prepare registered nurses. Representatives of each strongly stated that the other institution had never attempted to interfere with their institution's reaching its goals. They acknowledged the potential for conflict but said realistic expectations keep it low.

The amount of conflict between North Central and Pioneer is also small, although both organization see the potential for conflict between Pioneer's adult education services and North Central's services for upgrading and retraining workers. Each clearly stated that the other organization has never interfered with the attainment of their respective goals.

Likewise, North Central and the Mid-Ohio Consortium indicated that there is no administrative conflict, but some programmatic conflict. North Central's agent for the Ohio Technology Transfer Organization (OTTO) and the consortium sometimes have a conflict over domain in working with certain companies. Also, the consortium and North Central's continuing education department are occasionally in conflict. Resolutions are worked out on a one-to-one basis. Again, neither party felt there was any deliberate attempt to interfere with the attainment of goals.

Process Dimensions

The flow of activities coming from the structural arrangement is the process dimensions. It is these activities that reveal how well the relationship is functioning.

Resource flows refer to units of exchange between organizations, such as money, facilities, materials, clients, and staff services. Both the amount and direction of resource flows are important to the relationship. At the field site, the greatest resource flow was between North Central and Mansfield General. Examples of this are the provision of the clinical training facility by the hospital, the continuous supervision of the students at the hospital by college faculty, the provision of patient care for educational purposes by the students, and the flow of North Central graduates to the hospital for employment.

The resource flow between North Central and Pioneer is on an occasional basis, with major sharing in the areas of personnel and clients. Some students take developmental classes at North Central. Others continue their education there. Faculty and professional staff from both schools are involved in the process of articulation.

In the college/consortium relationship, North Central continuously supports the consortium by providing office space, telephones, and support services. The executive director of the consortium continuously "sells" the services of the consortium and its members (including North Central). However, only occasionally do funds flow from the consortium to the college for training projects.

Information flows refer to the frequency, direction, and mode of communication between organizations. Information exchange may involve a variety of media, such as newsletters, memoranda, formal letters, phone conversations, and informal and formal meetings. Some indication of the intensity of information flow may be shown by the frequency of the exchanges and the time devoted to them. Quality is also a factor, but is more difficult to use in making comparisons. Communication between North Central, Mansfield General, Pioneer, and Mid-Ohio Consortium appears to be frequent, flows in both directions, is of high quality, and is generally perceived as being very important. Some differences of opinion exist, however, as to which side initiates the most contacts.

In the case of the college/hospital relationship, North Central thought it initiated contacts more often, while Mansfield General thought that initiations were about equal. In the college/vocational school relationship, North Central said the two schools initiated contacts about equally, while Pioneer said that it made the most contacts. In North Central's relationship with the Mid-Ohio Consortium, both agreed that the consortium executive director initiated most of the contacts.

Procedural conflict occurs over interpretation and application of rules, principles, and procedures, as well as roles and performance of a particular position or unit. Such conflicts usually occur between organizations with greatly differing goals, technologies, structures, or orientation toward environment. All three dyads exhibited an extremely low level of conflict. All organizations said that when differences occur, they are worked

out very well, usually thorough personal contact and on an individual basis. The organizations' highly compatible operating philosophies, along with good communication and dedicated leadership, help to reduce conflict once it occurs.

Outcome Dimensions

For an interagency relationship to succeed, not only must its structure and processes function well, but both organizations must perceive the endeavor as worthwhile. Two outcome dimensions important to such perception are effectiveness and impact.

Effectiveness is reached when both organizations meet their commitments, agreements are perceived by all as equitable, the relationship is productive in terms of expectations, conflict resolution is satisfactory, and mutual evaluation continues to be positive.

North Central and Mansfield General agreed readily that commitment had been fulfilled. In the college/vocational school relationship, both agreed that there was strong commitment but that the efforts need to be continued. North Central and the consortium rated commitment as consistently high.

When asked about the relationship's degree of effectiveness, North Central agreed the Mansfield General relationship has provided its students with good clinical experiences, and the hospital agreed it has received good employees and stimulation for its own staff through North Central. In the college/vocational school linkage, representatives from both believed that students have benefitted greatly from the articulated arrangement, and discussions concerning curriculum have helped reduce content duplication.

In the college/consortium arrangement, the consortium's executive director stated that without its member institutions, the consortium is nothing. North Central affirmed that it has benefitted from conducting the projects assigned to it via the consortium. In addition, the relationship with the consortium has helped in marketing the institution to potential clients. The college president said that the college's commitment to economic development is the driving force in its consortium participation.

Impact is defined here as the extent to which the member organizations are perceived to change or affect one another's internal operations. At the field site, all indicated that the relationship did bring about some changes in their operation. In working with Mansfield General, North Central has made some scheduling changes, and in an attempt to establish an internal awareness for organizational relationships, is more conscious of effective relationships with other agencies. At Mansfield General, individual responsibilities have changed slightly. Having the North Central nurses at the hospital frees certain hospital personnel to do other things and has improved cost-effectiveness.

Both North Central and Pioneer Joint Vocational School have specified competencies within their curricula more exactly and have made other minor curricula changes.

In the college/consortium relationship, the consortium executive director is involved in regular college meetings and has made presentations to administrators and faculty. On the college's organizational chart, responsibility for relations with the consortium lies with the vice-president for academic affairs. Regarding impact on the consortium, the consortium executive director said this organization's operational procedures have evolved with input from consortium members (including North Central) as a result of mutual need.

CONCLUSIONS

Applying the interorganizational framework to vocational education and other service-producing agencies demonstrates its usefulness in analyzing and understanding relationships. No important dimensions appear to be missing; however, a longitudinal study would be helpful in capturing the dynamics of change.

For those who would promote or seek interagency arrangements, researchers conclude and observe the following:

- An organization considering linkage with others should first identify its resource needs and then look to organizations with complementary needs as partners.
- Mandates for interagency relationships should be consistent for all member organizations. One type of member organization should not be required to participate while others are only encouraged to do so.
- Organizations should clarify in advance areas of agreement and disagreement. Begin with mutual understanding of major problem areas and plan around them, rather than encountering them later when they might cause the relationship to fail.

- Start with small efforts when building initial linkages. This is particularly important where complex linkages are a longer range objective. Small successes encourage commitment to tackle more difficult joint undertakings.

- Areas of collaboration should be chosen in which the procedures and methods involved are standardized in each of the agencies or organizations involved. This promotes mutual understanding and effective communications.

- Too much initial formalization should be avoided. In the early stages, linkages need to be relatively flexible. Then partners can work out disruptions with few constraints.

- Give attention to all levels of the organizations that will be affected by the linkage. Solid linkage develops when all levels and elements of the linking organizations intermesh with little disruption. If linkage is only at the top, while the other levels find it difficult to work together, the relationship is not likely to continue.

- Some conflict is inevitable. Establish procedures for handling and resolving conflicts in advance.

FURTHER RESEARCH

National Center researchers suggest at least two areas where further study is needed:

- A systematic national collection of data on vocational education interagency relationships using an interorganizational framework for analysis and interpretation is necessary for more complete understanding of such relationships and how to further their development.

- Further studies are needed to examine the evolution of interorganizational relationships involving vocational education agencies to better understand their maturation, since interagency relationships exist at various levels of intensity and stages of maturity.

FIELD STUDY METHODOLOGY

Since the focus of this study was on the relationship between vocational education and other service deliverers, a dyadic perspective was adopted. The dyad is the basic unit of analysis in interorganizational relationships. A dyadic perspective is one in which the relationship between a pair of organizations is considered, regardless of other organizations with which each of them may also have relationships.

An interview protocol, based on a framework of conditions conducive to promoting and sustaining relationships between organizations, was used to collect the data from the field site. Interviews with key administrative and supervisory personnel were conducted over a 2-day period. In some cases, additional follow-up information was obtained by telephone. A copy of this questionnaire can be found in the research document from which this *Facts & Findings* issue was taken.

REFERENCE

Van de Ven, Andrew H. "On the Nature, Formation, and Maintenance of Relations among Organizations." *Academy of Management Review* 1, no. 4 (1976): 24-36.

This is a summary of the research document titled *Linkage of Vocational Education and Related Service Deliverers*, by Allen Wiant, Catharine P. Warmbrod, and Frank C. Pratzner. The full report of this study is available in the Education Resources Information Center (ERIC) system, ERIC Document Reproduction No. 240 267. For information on how to obtain ERIC documents, contact the National Center's ERIC user services coordinator at 800-848-4815 (toll free outside Ohio) or 614-486-3655. Ask about the ERIC document by number or by the document name given in this paragraph.

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